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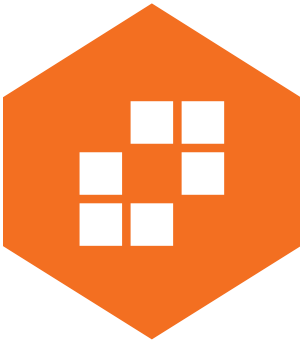
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Ubiquanny: Uncanny Perceptions of Ubiquitous Computing

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Abstract: Designers have worked diligently to dispel early uncanny perceptions of computers and computing devices as threatening and malevolent by developing Snow White devices such as the MacBook or the family-targeted Wii games console. OSX home folders, user accounts, and the friendly Mii avatars of the Nintendo console are the latest attempt to dispel negative mythologies from media such as 2001's Hal 9000 and the techy bedroom programming culture of early home computing, a design trajectory which may be evidenced as far back as Jerry Mannocks' friendly case design for the original Macintosh. Not all users however, are content in confining their activity within these safe environments and choose instead to extend their computing experience by connecting to outboard peripheral devices such as the Arduino board. With its exposed and modifiable components cabled to the host device, it echoes the visceral impact of performance artist Stelarc's techno-appendages, a literal embodiment of McLuhan's extensions of Man. The virtual home of the GUI is not the only home at risk. Devices such as the 3DS console threaten our perceptions of our real homes through AR cards and virtual reality. Users may conjure a holographic image of a dragon for example, which when viewed through the device's screen, appears to occupy real space within the user's actual home environment. Do these corruptions of the home environment, virtual and actual, serve to reinforce a literal interpretation of Freud's uncanny or unheimlich (literally, the unhomely) when observed through the pervasive and physical embodiments of ubiquitous computing devices, or do they indicate a need for designers of devices to embrace extensibility within their remit?

Keywords: Ubiquitous Computing, Uncanny, Macintosh, Wii, 3DS, Virtual Reality, Stelarc, McLuhan

INTRODUCTION

Designers have worked diligently to dispel early uncanny perceptions of computers and computing devices as threatening and malevolent by developing snow white devices such as the MacBook or the family targeted Wii games console.

Freud's concept of the uncanny, as explored in his paper of 1919, derives from usage of the German term *unheimlich*;

"...the German word *unheimlich* [of which the nearest semantic equivalents in English are 'uncanny' and 'eerie', but which etymologically corresponds to 'unhomely']"
Sigmund Freud (Freud, 2003. p. 124)

In an earlier work, *On the Psychology of the Uncanny* (1906), Ernst Jentsch explores the notion of an uncanny of the unfamiliar, relating automata and waxworks as examples.

In her book, *Death 24x a Second*, author Laura Mulvey interprets Jentsch's observations as a sort of technological uncanny of the new and unfamiliar, when she quotes Jentsch in the following passage;

“Even when they know they are being fooled by merely harmless illusions, many people cannot suppress an extremely uncomfortable feeling.”
(Jentsch, 1995)

Writing in 1970, Masahiro Mori, attempted to map, uncanny reactions to robots or robotic devices that resembled humans. In his landmark paper, *The Uncanny Valley*, Professor Mori suggested that his research could also be extended to relate to device design as well when he writes;

“This map is also necessary to create...devices to which people can relate comfortably.”
(Mori, 2012)

The above is a particularly prophetic statement, when one considers that at the time of writing, a personal computing device market had yet to be developed, let alone video games, home computers, mobile phones or even electronic calculators.

It is in the sense of Freud’s *unheimlich* or unhomely and Jentsch’s technological uncanny, and Mori’s reference to the consideration of the uncanny valley in device design, that home computing and games consoles design, will be explored in terms of both historical development and most recent trends of innovation.

Large and Small

Uncanny perceptions of computers may be evidenced in both the historical and the fictional and even the fictionalized historical. HAL 9000 [Figure 1] (Heuristically programmed Algorithmic computer), the ship board computer in Stanley Kubrick’s film; *2001: A Space Odyssey* (1968) is a clever fictionalization of two real-life super computers, the IBM Mark 1 (Automatic Sequence Controlled Calculator), developed in 1944 for business applications, and the ENIAC 1 (Electrical Numerical Integer Calculator), commissioned by the US military, in 1946, for the calculation of firing tables. (Laing, 2004)

These two heavyweight computers, the Mark 1 weighing in at five tons and the ENIAC 1 at 30 tons (Laing, 2004. P. 9) sit historically like cyclopien bookends framing the cataclysmic events of August 1945, and in doing so, seed human consciousness with an inevitable malevolent association between supercomputers and the atom bomb.

In fact, in the novelization of the film; *2001: A Space Odyssey*, screenwriter Arthur C. Clarke, even goes so far as to describe the HAL 9000 as a successor of “clumsy high-speed morons as ENIAC”. (Clarke, 1968) The IBM Mark 1 is referenced in his choice to name the Discovery’s computer HAL; using the three letters that fall alphabetically before those found in the International Business Machines acronym (IBM).

In 1971, Intel engineer Ted Hoff, inadvertently produced the first microprocessor while developing a multifunction calculator chip for Japanese company Busicom. The 4004, as it was known, packed the computational power of the ENIAC 1 into a chip a sixth of an inch long. Its successor, the 8088 was chosen in 1974, for use in the first kit-form personal computer, the MITS Altair and the IBM PC. (Laing, 2004)

It is from these roots that an early home computing market developed. The first generation of these monochromatic machines were swaddled in the greenish haze of electronics kit culture and basic programming, which was little evolved from machine language itself.

Perhaps an origin for an uncanny perception of computing may result from the notion of taking the computing power of the giant ENIAC 1, with its negative associations, real and fictional and compressing it into a tiny chip destined for a home computing market item. This paper will explore the notion that a change has occurred in how ubiquitous computing practice is perceived in the context of the uncanny from the dawn of the personal computing age to the present day.

There's No Place like Home

OSX Home folders [Figure 2] and user accounts and the friendly Mii avatars [Figure 3] of the Nintendo console are a recent attempt to dispel negative mythologies about computers originating from real-life associations and fictional media, such as Hal 9000 from Stanley Kubrick's 1968 film, 2001: A Space Odyssey and the techie bedroom programming culture of early home computing.

Metaphors of home and body are used to soften the mediation between the physical body and the computing device by integrating a virtual body or home into the personal computer or console. Since our bodies may be regarded as our homes, as Vivian Sobchack relates in the following passage from her book, *Carnal Thoughts: Embodiment and Moving Image Culture*;

“...our bodies are our essential premises of our being in the world...we may think of our bodies...as our home...”
(Sobchack, c2004. p. 182)

OSX home folders and Mii avatars would seem to provide a similar mediating role for alternative devices; the home folders for personal computer and the personal avatar for games consoles.

The home folder becomes a portable version of the user's actual home, containing intimate personal effects, such as photographs, personal documents and a music collection; the avatar serves to bring our own bodies into the games environment, increasing a feeling of immersion.

In the early 1980s Apple visionary, Steve Jobs, realized that to facilitate an expansion of the personal computer market, a necessary makeover was required to both the exterior casing of the personal computer and the visual organization of its screen. This two pronged approach was explored in the development of the first generation Macintosh computer. [Figure 4]

Jerry Mannocks, who was responsible for the well known smiling case design (Laing, 2004) and graphic designer Susan Kare, who designed custom fonts and distinctive icons for the machine's graphical user interface (Caplin, 2001), collectively inspired an approach to PC case and GUI (graphical user interface) design, which may still be evidenced in personal computing and console development, in its most current form.

Recent examples of computing devices, such as the all-white MacBook [Figure 5] and Wii games consoles are draped in white plastic exteriors that at once portray the innocence and cleanliness of the ideal home and reference historical trends in kitchen appliance design.

The OS X home folder, the root icon of which, is rendered as a little house, reinforces these themes of home and innocence in the GUI of the operating system. Individual folders for digital media, reference home or domestic examples of this media, by using terms such as music for audio, movies for video and pictures for images to conjure the nostalgic imagery of record collections, home movies and family photo albums.

The friendly Mii avatars of the Wii games console appear to be a similar attempt to project family oriented iconography into both the GUI of the system and certain manufacturer produced games. This integrated approach, reinforces the company's connection to its family oriented market and attempts to dispel negative connotations of both computing and computer games. OSX home folders and Mii avatars would therefore seem to be a way of softening the mediation between our bodies and the computing device.

That these approaches to both the exterior case and GUI design may be evidenced in both the Xbox 360 console and the Windows 7 operating system, seem to indicate a validation of this approach by Microsoft. The all-white housing of the console may be an attempt to soften the hardcore image of the Xbox 360 in the light of a growing casual games market and the root folder structure of the Windows 7 operating system, may be perceived as an attempt to embrace similar home folder structures, to those found in OSX.

Extensions of Man

“Rapidly we approach the final phase of the extensions of man-the technological simulation of consciousness.”

Marshall McLuhan (McLuhan, 1967)

Not all users of the now ubiquitous personal computer, are content in confining their creative computing activity within the safe environments of kitchen appliance-like, molded white plastic housings and domesticated home folders. Instead, they choose to extend their computing experience, by connecting to outboard peripheral devices, such as the Arduino board [Figure 6].

The Arduino is a small micro-controller board, which may be connected to the computer wirelessly or via USB. The design of the board maximizes customization and the unit may run independent of the host computer. It has multiple connection sockets which can be connected to a wide range of external electronics. (Monk, 2010)

Arduino and similar clones are the product of a computer hardware philosophy that has developed from open source software development models are licensed under a Creative Commons Attribute Share-Alike License.

“We believe that people should be able to study our hardware to understand how it works, make changes to it, and share those changes.”

The Arduino Team (Arduino, 2011)

The software for the unit is open source as well, and supports multiple platforms including Windows, Macintosh and Linux. The system is popular with artists, designers and musicians working in the digital medium.

With it's exposed and modifiable components cabled to the host device, the Arduino board, connected and unconnected, invokes a technological uncanny (Mulvey, 2006) feeling reminiscent of the visceral impact of the work of performance artist, Stelarc. In works such as *Third Hand* (1984) [Figure 7] and *Exoskeleton* (1999) the techno-appendages connected to the artist's physical body may be viewed as a literal embodiment of McLuhan's extensions of Man.

Indeed, Stelarc recognizes the influence of McLuhan in his work (Smith, 2005 p. 230) and in the following passage outlines his interpretation of McLuhan's ideas in his own practice:

“McLuhan's notions that technology is the external organs of the body and that with electronic circuitry we outer our nervous system are astute realizations. The body always has been a prosthetic body coupled to its technology.”

Stelarc (Smith, 2005 p. 232)

Just as Stelarc outers his nervous system with techno-appendages the home computer extended with the Arduino board outers its un-cloaked technology to produce an uncanny effect relating to an earlier more malevolent image of computing predating our current age of domesticated computing devices. In a way too, the technological uncanny Stelarc engages with in his art, may be viewed as a reversal of Mori's uncanny valley. As it is modified by technology, Stelarc's natural form (his body) produces an uncanny effect whereas Mori's technological form (the robot) produces an uncanny effect, when it is made to more closely resemble the human form. Both examples may be unsettling; the body mediated by technology, technology mediated by the body.

Our Homes at Risk!

The virtual home of the GUI is not the only home at risk. Devices such as the 3DS console [Figure 8] threaten our perceptions of our real home environments, through AR cards and vir-

tual reality. Users of the 3DS may conjure a holographic image of a dragon [Figure 9], for example, which when viewed through the device's screen appears to occupy real space within the user's actual home environment.

AR (Augmented Reality) technology creates the sensation that virtual objects are present in the real world (Cawood, 2007) and is most effective when it is used to combine VR (Virtual Reality) elements with real-time video resulting in an enhanced effect of immersion.

Although, rudimentary forms of the technology have been in existence since the late 1960s, such as Ivan Sutherland's experiments using wireframe models and HMD (head-mounted display), it is the fictionalization of this technology in films such as TRON (1982) and The Matrix (1999) that has spawned popular awareness of both the technology and its (potential) immersive effect.

The Nintendo 3DS games console leads the pack regarding current mobile applications which exploit this technology and the AR system it employs is both stable and compatible with the refined product design evident in both the Wii console and the games software produced by Nintendo, for the two systems.

The system uses AR (Augmented Reality) cards as a platform to lock the camera of the device onto a flat surface in the targeted environment. Pattern recognition software on the ROM of the console is used to link a specific card to specific models in mini-game applications, pre-loaded onto the memory of the game system, which is then rendered in three dimensions, using the same AR card as a base, for positioning.

The rendered graphics are then composited with the imaged view from the console's camera and refreshed on a timeline matching the video capture speed as a sort of a games or interactive layer. Users may interact with the composited graphics, through input systems of the console, as if the interactive elements were actually situated in the users real-life home environment.

The home environment captured by the camera lens and displayed in it's viewfinder appears to resemble similar video (home movies) captured on an unaugmented device such as a digital camera or camcorder and yet, the resemblance is imperfect, since the viewfinder image has been augmented with AR technology layers. Therefore the uncanny effect seems to result from the combining of the familiar (the users actual home environment) with the unfamiliar (the game layers produced by the AR technology).

Conclusions

Do these corruptions of the home environment virtual and actual serve to reinforce a literal interpretation of Freud's Uncanny or Unheimlich (literally, the unhomely) when observed through the pervasive and physical embodiments of ubiquitous computing devices or do they indicate a need for designers of devices to embrace extensibility within their remit?

There can be little doubt that a OSX home folders and friendly Mii Avatars are an attempt to dispel negative perceptions of computers from both fiction and reality and that these attempts to soften the mediation of computing have their roots in the development of early home computers such as the first generation Macintosh.

That an uncanny effect emerges when technologies such as the Arduino board are used to extend the creative capabilities of these same, now ubiquitous computing devices, reveals just how fragile these mediating design strategies are and how quickly they may be subverted by older perceptions of computing technologies.

Although AR technology and especially that used on the 3DS console is in its infancy, it does give us a glimpse at how future technologies may blur the line between the perceived realism of the captured image and that of its manipulated counterpart. Perhaps it is because the technology is so new, that the digital manipulation of our actual home environments, may seem to have an uncanny effect, but it certainly is an effect which designers of personal computing systems, should take into account.

Finally, broadening markets for popular computing devices are producing a variety of challenges for designers and it remains to be seen whether all markets, home and creative, may be satisfied in a single device or a single design strategy; be that a strategy of cloaking a device in white plastic or extending its outered circuitry.

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Figures



Figure 1: *L (Kubrick, 1968) Hal 9000*

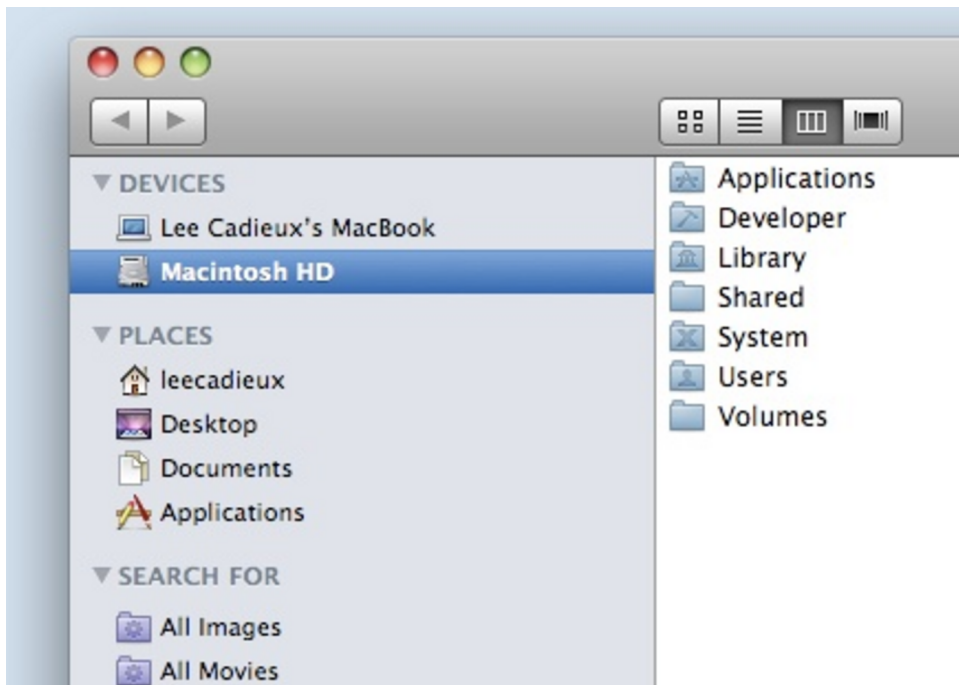


Figure 2: *Macintosh OS X Nested Home Folders*

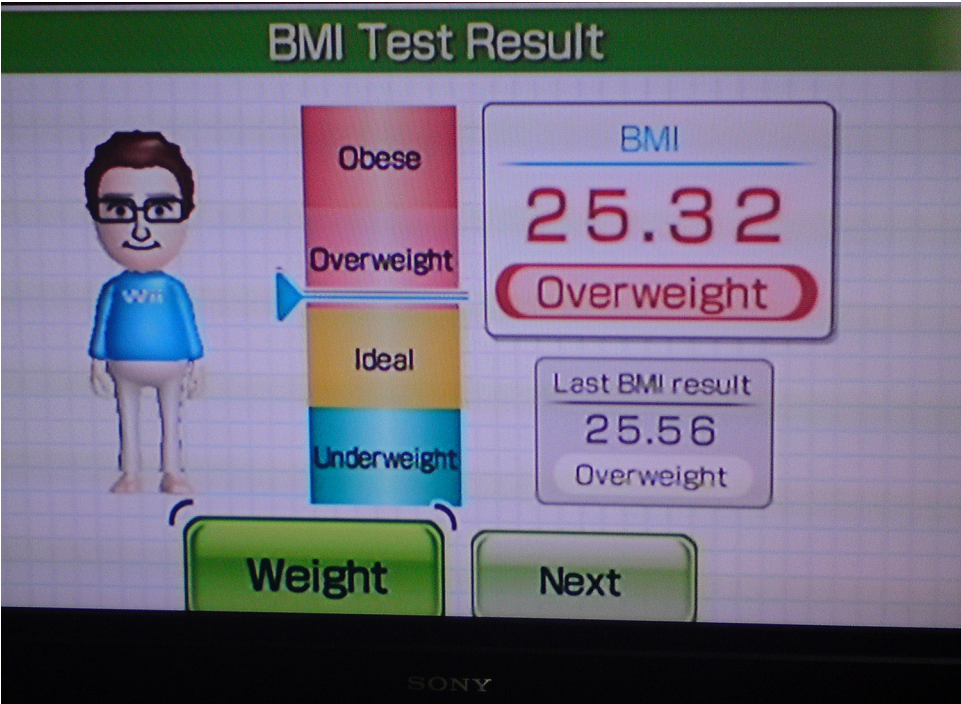


Figure 3: Author's Mii Avatar from Wii Fit



Figure 4: (Frith, 2012) Macintosh 128



Figure 5: (WhiteMacBook, 2007) All White MacBook

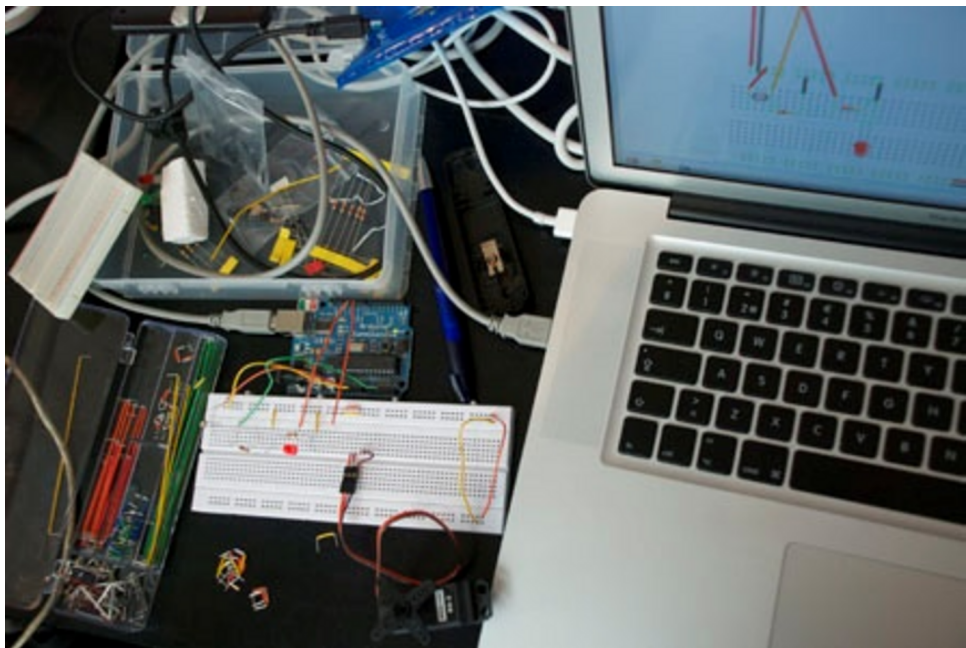


Figure 6: (Wehner, 2010) Arduino Board Attached to MacBook

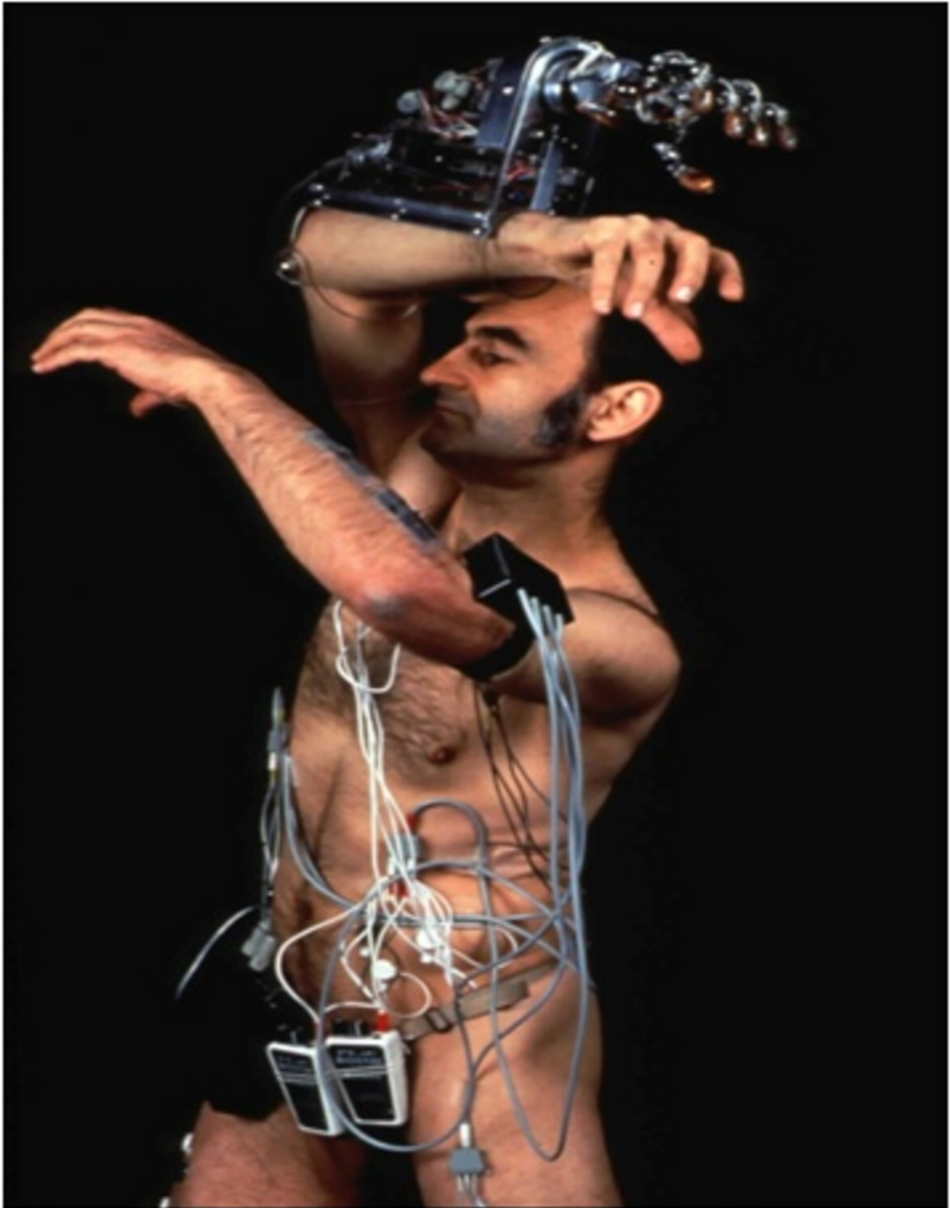


Figure 7: (Smith, 2005) Third Hand Stelarc 1984



Figure 8: (Kessler, 2010) Nintendo 3DS and AR Card



Figure 9: (Newton, 2011) Nintendo AR Game

ABOUT THE AUTHOR

Lee Cadieux: Lee Cadieux, originally from Canada, holds the post of Lecturer in Media Arts in the School of Media, Film and Journalism, University of Ulster. His academic career follows a 20 year career in Film and Animation and he has worked extensively on Features, TV Series, Documentary, Video Games and Commercials in the roles of Director, Editor and Animator. He has worked for Disney, Warner Bros., Nelvana and Crawley Films in Canada, China and the UK. He is Course Director for the Skillset accredited programmes MA Documentary Practice and MA Media Management and Policy, concentrating on research and teaching. His research interests include practice and theory-based work in Film, Media and Digital Performance.

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